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**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Application Number: 10/643,191
Filing Date: August 18, 2003
Appellant(s): GARDNER ET AL.

Tait R. Swanson
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 11/13/2007 appealing from the Office action mailed 07/20/2007.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

This appeal involves claims 1 – 4 and 6 – 28 currently pending under final rejection. Claim 5 has been canceled.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

| | | |
|---|---|---|
| 6,792,399 B1 | Philips et al. | 9-2004 |
| EP1102187 A2 | Henly et al. | 5-2001 |

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1 – 4, 6 – 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Philips et al. ('Philips' herein after) (US 6,792,399 B1) further in view of Henly et al. ('Henly' herein after) (EP 1102187 A2).

With respect to claim 1,

Philips discloses a system for assessing and optimizing crude selection comprising:

- a database storing data comprising crude characteristic data related to a plurality of different crudes or crude blends crude processing data related to crude processing at a plurality of different operational conditions (column 8 lines 12 – 21 and 31 – 41, Philips); and
- a predictive engine having programmable instructions configured for execution by at least one processor wherein the predictive engine is configured to assess similarity of the crude characteristic data and the crude processing data of plurality of different crudes or crude blends with input crude characteristic data and input crude processing data of the respective crude or crude blend, to output statistical best matched with the data stored in the database, wherein the predictive engine is configured to execute at least one predictive performance and/or risk assessment model designed to optimize or improve a refining process based on the statistical best matches (column 9 lines 34 – 44 and column 56 lines 47 – 56, Philips).

Philips however does not disclose the crude selection and blend.

Henly teaches the crude selection and blend (page 2 paragraph 0004 and 0012, Henly) and assessing similarity of the crude characteristic data and using prediction models to optimize the refining process (page 6 paragraphs 0059 – 0060, Henly).

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because Henly's prediction of properties of and optimization of plant's output of products in combination with the prediction models and risk analyzer of Philips would result in accurate prediction of the crude oil blend to be used (paragraph 0004 and 0012, Henly).

4. Claims 2 – 4, 6 – 10 are rejected under the same rationale given for claim 1. The citations of the elements claimed and taught are listed below.

With respect to claim 2,

Philips discloses the system in accordance with claim 1, wherein the predictive engine takes as input crude information corresponding to at least one crude slate and at least one refinery operating parameter and/or condition (column 11 lines 40 – 54, Philips) and uses desirability metrics to assess similarity of the input to data in the database (column 10 lines 59 – 67, Philips).

With respect to claim 3,

Philips discloses the system in accordance with claim 2, wherein the at least one refinery operating parameter and/or condition corresponds to a specific refinery

(paragraph 0065, Henly), and wherein the at least one predictive performance or risk assessment model executed by the predictive engine predicts performance or risk measures of refining the at least one crude slate using the specific refinery for running the refining process (paragraphs 0039 and 0043, Henly), probability of problems occurring during the refining process, and distribution of the problems throughout the refining process (column 10 lines 59 – 67, Philips).

With respect to claim 4,

Philips discloses the system in accordance with claim 1, wherein the predictive engine accesses treatment options stored within the database suitable for optimizing performance of the refining process (column 44 lines 30 – 51, Philips).

With respect to claim 6,

Philips discloses the system in accordance with claim 1, wherein the predictive engine comprises:

- a crude search module which takes as input at least one crude name and/or at least one chemical or other characteristic of the at least one crude identifiable by the at least one crude name and outputs information with respect to at least one crude stored in the database, wherein the at least one crude output by the crude search module corresponds to at least one crude identifiable by the at least one crude name, or corresponds to at least one crude having at least one chemical or other property similar to at least one

chemical or other property of the at least one crude identifiable by the at least one crude name (column 9 lines 34 – 44 and column 56 lines 47 – 56, Philips);

- an operating parameters/conditions search module which takes as input at least one refinery operating parameter and/or condition and outputs information stored in the database indicating at least one refinery having at least one identical or similar operating parameter and/or condition compared to the at least one refinery operating parameter and/or condition input (column 11 lines 40 – 54, Philips); and
- a crude slate and chemicals selection module which takes as input the information output by the crude search module and the information output by the operating parameters/conditions search module, and outputs at least one proposed crude slate, chemical treatment and/or performance or risk parameter (column 44 lines 30 – 51, Philips).

With respect to claim 7,

Henly teaches wherein the crude slate and chemicals selection module includes a first tier, wherein the first tier identifies at least one crude slate stored in the database which is similar to at least one user-desired crude slate by scoring each crude slate component of the at least one user-desired crude slate based on how well the crude slate component satisfies user criteria, and combines all individual scores of the at least one user-desired crude slate to provide a composite crude slate score; wherein the first

tier further scores each individual operating parameter and/or condition based on how well the individual operating parameter and/or condition satisfies the user criteria for that operating parameter and/or condition and outputs an operational score, and then combines all individual operational scores to provide a composite operational score; and wherein the first tier further determines a highest total overall score by combining the composite crude slate and composite operational scores (paragraphs 0060 and 0062, Henly).

With respect to claim 8,

Henly teaches wherein the crude slate and chemicals selection module further includes a second tier, wherein the second tier includes as an input at least information derived by the first tier and obtains predicted response parameters of interest for selected crude slates, operational parameters and/or conditions, and/or chemical treatments using the at least one predictive performance model (page 1 section 57, Henly).

With respect to claim 9,

Philips discloses the system in accordance with claim 1, wherein the predictive engine executes at least one optimization algorithm for the refining process (column 45 lines 16 – 25 and column 54 lines 61 – 67, Philips).

With respect to claim 10,

Philips discloses the system in accordance with claim 9, wherein the at least one predictive performance model and/or the at least one risk assessment model is a type of model selected from the group consisting of linear regression models; logistic regression models; non-linear regression models; classification and regression trees and extensions thereof; multiple additive regression splines and extensions thereof; partial least squares regression models (column 12 lines 54 – 62, Philips); generalized additive models; neural networks and extensions thereof, such as projection pursuit regression (column 4 lines 33 – 40 and column 44 lines 26 – 31, Philips); simulation models (column 3 lines 58 – 62, Philips); expert system-based models, such as Bayesian Belief Networks; theoretical calculation models; engineering economic models; financial risk models; decision analytic models; and engineering process models based on chemistry, physics and engineering principles, such as reaction kinetics and thermodynamics, mass transfer, energy transfer, separation processes, and fluid dynamics (column 55 lines 13 – 33, Philips).

With respect to claim 11,

Philips discloses a method for assessing and optimizing crude selection comprising the steps of:

- accessing a database for obtaining data comprising crude characteristic data related to a plurality of different stored crude or crude blend (column 8 lines 12 – 21 and 31 – 41, Philips) and crude processing data related to crude processing at a plurality of different operational conditions;

- assessing similarity of the crude characteristic data and the crude processing data of the plurality of different crudes or crude blends with input crude characteristic data and input crude processing data, of the respective crude or crude blend to output statistical best matches with the data stored in the database; and
- executing at least one predictive performance and/or risk assessment model to optimize or improve a refining process for at least one crude or crude blend based on the statistical best matches (column 9 lines 34 – 44 and column 56 lines 47 – 56, Philips).

Philips however does not disclose the crude selection and blend.

Henly teaches the crude selection and blend (page 2 paragraph 0004 and 0012, Henly) and assessing similarity of the crude characteristic data and using prediction models to optimize the refining process (page 6 paragraphs 0059 – 0060, Henly).

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because Henly's prediction of properties of and optimization of plant's output of products in combination with the prediction models and risk analyzer of Philips would result in accurate prediction of the crude oil blend to be used (paragraph 0004 and 0012, Henly).

5. Claims 12 - 16 are rejected under the same rationale given for claim 11. The citations of the elements claimed and taught are listed below.

With respect to claim 12,

Philips discloses the method in accordance with claim 11, further comprising the steps of:

- taking as input crude information corresponding to the at least one crude or crude blend and at least one refinery operating parameter and/or condition (column 11 lines 40 – 54, Philips); and
- using desirability metrics to assess similarity of the input to data in the database, including the at least one stored crude or crude blend (column 10 lines 59 – 67, Philips).

With respect to claim 13,

Philips discloses the method in accordance with claim 12, wherein the at least one refinery operating parameter and/or condition corresponds to a specific refinery (paragraph 0065, Henly), and wherein the at least one predictive performance or risk assessment model predicts performance or risk measures of refining the at least one crude or crude blend using the specific refinery for running the refining process (paragraphs 0039 and 0043, Henly), probability of problems occurring during the refining process, and distribution of the problems throughout the refining process (column 10 lines 59 – 67, Philips).

With respect to claim 14,

Philips discloses the method in accordance with claim 11, further comprising the step of accessing treatment options stored within the database suitable for improving or optimizing performance of the refining process (column 44 lines 30 – 51, Philips).

With respect to claim 15,

Philips discloses the method in accordance with claim 11, further comprising the step of executing at least one optimization algorithm for the refining process (column 45 lines 16 – 25 and column 54 lines 61 – 67, Philips).

With respect to claim 16,

Philips discloses the method in accordance with claim 15, wherein the at least one predictive performance model and/or the at least one risk assessment model is a type of model selected from the group consisting of linear regression models; logistic regression models; non-linear regression models; classification and regression trees and extensions thereof; multiple additive regression splines and extensions thereof; partial least squares regression models (column 12 lines 54 – 62, Philips); generalized additive models; neural networks and extensions thereof, such as projection pursuit regression; simulation models (column 3 lines 58 – 62, Philips); expert system-based models, such as Bayesian Belief Networks; theoretical calculation models; engineering economic models; financial risk models; decision analytic models; and engineering process models based on chemistry, physics and engineering principles, such as reaction kinetics and thermodynamics, mass transfer, energy transfer, separation

processes, and fluid dynamics (column 55 lines 13 – 33, Philips).

With respect to claim 17,

Philips discloses a computer readable medium storing a set of instructions configured for execution by at least one processor for performing the steps of:

- accessing a database for obtaining data comprising crude characteristic data related to a plurality of different stored crudes or crude blends (column 8 lines 12 – 21 and 31 – 41, Philips) and crude processing data related to crude processing at a plurality of different operational conditions;
- assessing similarity of the crude characteristic data and the crude processing data with input crude characteristic data and input crude processing data of the plurality of different crudes or crude blends, of the respective crude or crude blend to output statistical best matched with the data stored in the database; and
- executing at least one predictive performance and/or risk assessment model to optimize or improve a refining process for at least one crude or crude blend based on the statistical best matches (column 9 lines 34 – 44 and column 56 lines 47 – 56, Philips).

Philips however does not disclose the crude selection and blend.

Henly teaches the crude selection and blend (page 2 paragraph 0004 and 0012, Henly) and assessing similarity of the crude characteristic data and using prediction models to optimize the refining process (page 6 paragraphs 0059 – 0060, Henly).

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because Henly's prediction of properties of and optimization of plant's output of products in combination with the prediction models and risk analyzer of Philips would result in accurate prediction of the crude oil blend to be used (paragraph 0004 and 0012, Henly).

6. Claims 18 - 22 are rejected under the same rationale given for claim 17. The citations of the elements claimed and taught are listed below.

With respect to claim 18,

Philips discloses the computer readable medium in accordance with claim 17, further performing the steps of:

- taking as input crude information corresponding to the at least one crude or crude blend and at least one refinery operating parameter and/or condition (column 11 lines 40 – 54, Philips); and
- using desirability metrics to assess similarity of the input to data in the database, including the at least one stored crude or crude blend (column 10 lines 59 – 67, Philips).

With respect to claim 19,

Philips discloses the computer readable medium in accordance with claim 18, wherein the at least one refinery operating parameter and/or condition corresponds to a

specific refinery (paragraph 0065, Henly), and wherein the at least one predictive performance and/or risk assessment model predicts performance or risk measures of refining the at least one crude or crude blend using the specific refinery for running the refining process (paragraphs 0039 and 0043, Henly), probability of problems occurring during the refining process, and distribution of the problems throughout the refining process (column 10 lines 59 – 67, Philips).

With respect to claim 20,

Philips discloses the computer readable medium in accordance with claim 17, further performing the step of accessing treatment options stored within the database suitable for optimizing performance of the refining process (column 44 lines 30 – 51, Philips).

With respect to claim 21,

Philips discloses the computer readable medium in accordance with claim 17, further performing the step of executing at least one optimization algorithm for the refining process (column 45 lines 16 – 25 and column 54 lines 61 – 67, Philips).

With respect to claim 22,

Philips discloses the computer readable medium in accordance with claim 21, wherein the at least one predictive performance model and/or the at least one risk assessment model is a type of model selected from the group consisting of linear

regression models; logistic regression models; non-linear regression models; classification and regression trees and extensions thereof; multiple additive regression splines and extensions thereof; partial least squares regression models (column 12 lines 54 – 62, Philips); generalized additive models; neural networks and extensions thereof, such as projection pursuit regression (column 4 lines 33 – 40 and column 44 lines 26 – 31, Philips); simulation models (column 3 lines 58 – 62, Philips); expert system-based models, such as Bayesian Belief Networks; theoretical calculation models; engineering economic models; financial risk models; decision analytic models; and engineering process models based on chemistry, physics and engineering principles, such as reaction kinetics and thermodynamics, mass transfer, energy transfer, separation processes, and fluid dynamics (column 55 lines 13 – 33, Philips).

With respect to claim 23,

Philips discloses a system comprising: a crude analyzer configured to compare a selected crude type and a selected refinery parameter with historical data comprising crude data related to a plurality of crude types and refinery data related to a plurality of refineries (column 8 lines 12 – 21 and 31 – 41, Philips), wherein the crude analyzer is configured to identify one or more crude types and one or more refinery parameters in the historical data that are statistically similar to the selected crude type and the selected refinery parameter, respectively; and a refinery optimizer configured to improve a refining process for the selected crude type and the selected refinery parameter based on the one or more crude types and the one or more refinery parameters

identified by the crude analyzer (column 9 lines 34 – 44 and column 56 lines 47 – 56, Philips).

Philips however does not disclose the crude selection and blend.

Henly teaches the crude selection and blend (page 2 paragraph 0004 and 0012, Henly) and assessing similarity of the crude characteristic data and using prediction models to optimize the refining process (page 6 paragraphs 0059 – 0060, Henly).

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because Henly's prediction of properties of and optimization of plant's output of products in combination with the prediction models and risk analyzer of Philips would result in accurate prediction of the crude oil blend to be used (paragraph 0004 and 0012, Henly).

7. Claims 24 and 27 are rejected under the same rationale given for claim 23. The citations of the elements claimed and taught are listed below.

With respect to claim 24,

Philips discloses the system of claim 23, wherein the refinery optimizer is configured to evaluate a plurality of treatment options (column 44 lines 30 – 51, Philips).

With respect to claim 27,

Philips discloses the system of claim 23, wherein the refinery optimizer is further configured to improve the refining process by optimizing performance of the refining

process using information relating to a similar or identical crude slate and an associated chemical treatment, performance parameter (column 11 lines 40 – 54, Philips), or risk parameter, or a combination thereof, based on the statistical similarity of the selected crude type (paragraphs 0039 and 0043, Henly) and the selected refinery parameter with the one or more crude types and the one or more refinery parameters (column 44 lines 30 – 51, Philips).

With respect to claim 25,

Philips discloses a method, comprising: comparing a selected crude type and a selected refinery parameter with historical data comprising crude data related to a plurality of crude types and refinery data related to a plurality of refineries (column 8 lines 12 – 21 and 31 – 41, Philips), wherein comparing a selected crude type and a selected refinery parameter comprises identifying one or more crude types and one or more refinery parameters in the historical data that are statistically similar to the selected crude type and the selected refinery parameter, respectively and improving a refining process for the selected crude type and the selected refinery parameter based on the one or more crude types and the one or more refinery parameters identified in the comparing step (column 9 lines 34 – 44 and column 56 lines 47 – 56, Philips).

Philips however does not disclose the crude selection and blend.

Henly teaches the crude selection and blend (page 2 paragraph 0004 and 0012, Henly) and assessing similarity of the crude characteristic data and using prediction models to optimize the refining process (page 6 paragraphs 0059 – 0060, Henly).

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because Henly's prediction of properties of and optimization of plant's output of products in combination with the prediction models and risk analyzer of Philips would result in accurate prediction of the crude oil blend to be used (paragraph 0004 and 0012, Henly).

8. Claims 26 and 28 are rejected under the same rationale given for claim 25. The citations of the elements claimed and taught are listed below.

With respect to claim 26,

Philips discloses the method of claim 25, wherein improving comprises evaluating a plurality of treatment options (column 44 lines 30 – 51, Philips).

With respect to claim 28,

Philips discloses the method of claim 25, wherein improving comprises optimizing performance of the refining process using information relating to a similar or identical crude slate and an associated chemical treatment, performance parameter (column 11 lines 40 – 54, Philips), or risk parameter, or a combination thereof, based on the statistical similarity of the selected crude type (paragraphs 0039 and 0043, Henly) and the selected refinery parameter with the one or more crude types and the one or more refinery parameters (column 44 lines 30 – 51, Philips).

**(10) Response to Argument**

***Features of Independent Claims 1, 11 and 17***

Appellant argues that Philip and Henly alone or in combination fail to disclose storing data to a plurality of different crudes or crude blends and assessing similarity of crude characteristic data and crude processing data of the plurality of different crudes or crude blends with input crude characteristic data and input crude processing data of the respective crude or crude blend to output statistical best matches with the data stored in the database.

Examiner respectfully disagrees, as storing of data to a plurality if different crudes or crude blends and assessing similarity of crude characteristic data and crude processing data of the plurality of different crudes or crude blends with input crude characteristic data and input crude processing data of the respective crude or crude blend to output statistical best matches with the data stored in the database is taught by Philip in combination with Henly. In Philip column 10 lines 59 – 67 followed by column 11 lines 1 – 15 disclosed is the storing of plurality of the data and assessing of the similarity in the data using clusters and then statistically matching the data, when combined with Henly the data stored is the crude blends and crudes and all the information processed. Henly discloses the processing of data regarding the crudes and blends in paragraphs 4, 10 – 12, 59 – 60 and 75.

Appellant argues that Philip and Henly alone or in combination fail to disclose comparing a selected crude type and a selected refinery parameter with historical data comprising crude data related to a plurality of crude types and refinery data related to a plurality of refineries, wherein the crude analyzer is configured to identify one or more crude types and one or more refinery parameters in historical data that are statistically similar to the selected crude type and the selected refinery parameter, respectively.

Examiner respectfully disagrees, as comparing a selected crude type and a selected refinery parameter with historical data comprising crude data related to a plurality of crude types and refinery data related to a plurality of refineries, wherein the crude analyzer is configured to identify one or more crude types and one or more refinery parameters in historical data that are statistically similar to the selected crude type and the selected refinery parameter, respectively is taught by Philip in combination with Henly. In Philip column 9 lines 12 – 44, column 10 lines 59 – 67 followed by column 11 lines 1 – 15 and column 22 lines 43 – 60 disclosed is the comparison of historical data and an analysis on the historical data along with the statistical data, when combined with Henly the data being processed is the crude blends and crudes.

***Features of dependent claims 2, 12 and 18***

Appellant argues that Philip and Henly alone or in combination fail to disclose taking as input crude information corresponding to the at least one crude or crude blend and at least one refinery operating parameter and/or condition and using desirability

metrics to assess similarity of the input to data in the database, including the at least one stored crude or crude blend.

Examiner respectfully disagrees, as taking as input crude information corresponding to the at least one crude or crude blend and at least one refinery operating parameter and/or condition and using desirability metrics to assess similarity of the input to data in the database, including the at least one stored crude or crude blend is taught by Philip in combination with Henly. In Philip column 11 lines 40 – 54 and column 10 lines 59 – 67 disclosed is the taking the data and assessing similarity and using metrics, when combined with Henly the data being worked with is the crude blends. Henly discloses the processing of data regarding the crudes and blends in paragraphs 4, 10 – 12, 59 – 60 and 75.

***Features of dependent claims 27 and 28***

Appellant argues that Philip and Henly alone or in combination fail to disclose improving any refining process by optimizing performance of the refining process using information relating to a similar or identical crude slate and an associated chemical treatment, performance parameter, or risk parameter or a combination thereof, based on the statistical similarity of the selected crude type and the selected refinery parameter with the one or more crude types and the one or more refinery parameters.

Examiner respectfully disagrees, as improving any refining process by optimizing performance of the refining process using information relating to a similar or identical

crude slate and an associated chemical treatment, performance parameter, or risk parameter or a combination thereof, based on the statistical similarity of the selected crude type and the selected refinery parameter with the one or more crude types and the one or more refinery parameters is taught by Philip in combination with Henly. In Philip column 11 lines 40 – 54 and column 44 lines 32 – 51 along with the disclosure of Henly in paragraphs 39, 43 and 75 we find the improving of the refining using optimization on performance using different models and methods using parameters.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Navneet

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